

PATENT SPECIFICATION

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2A1, 2A2, 2C1, 2C3); B6 G14BX.

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COMPLETE SPECIFICATION

DRAWINGS ATTACHED

Method and Apparatus for Manufacturing Strip Mouldings

We, SCHOCK & Co., Gesellschaft mit beschränkter Haftung, a German Company, of 65 Gmünder Strasse, Schorndorf/Württemburg, Federal Republic of Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 The invention relates to a method and apparatus for manufacturing strip mouldings, the principal part of which consists of a plastics material, and the surface of which is partly or totally provided with a covering material.

15 Plastics strip mouldings, the surface of which is partly or totally covered with a covering, are already known. The covering is generally intended to produce a decorative effect; however, by choosing an appropriate covering material it is possible to achieve an increase in the strength of the strip moulding, and in many cases the covering acts as a securing means for the strip moulding.

20 Hitherto, it was known to apply to the extruded plastics strips moulding in a separate work stage, and in the case of metal coverings, if these were constructed simply as a flat band they were rolled on to the moulding element consisting of plastics, whereas in the case of a profiled construction they were fitted on to the moulding elements. Apart from the fact that this type of fastening of the covering was complicated and expensive, it was necessary for the purpose of fitting the strip with a covering.

25 It is the aim of the invention to simplify substantially the manufacture of strip mouldings provided with a covering and to render efficient production of such mouldings possible.

According to the present invention there is provided a method for the manufacture 45 of multi-part laminated mouldings which have a carrier moulding of plastics material entirely or partially provided with a ribbon-like cover, comprising the steps of extruding the plastics material through a die corresponding in cross-section to that of the carrier moulding, and mounting the cover-strip on the desired surface of the carrier moulding at a speed corresponding to the speed at which the carrier moulding 50 emerges, the cover-strip being brought into contact in non-molten state with the plastics material in an extension chamber which lies upstream of the actual extrusion die, a voltage agent being applied to that surface of the cover-strip not in contact with the plastics material and the two parts emerging from the die jointly as a complete laminated moulding.

It is therefore possible by this method to 65 manufacture a strip moulding provided with a covering in one work stage without subsequent treatment.

According to a further feature of the invention there is provided apparatus for 70 performing the method described above comprising a die unit and means for feeding thereto heat softened plastics material and a covering material, the die unit comprising a die, a plastics extrusion chamber 75 and means for guiding the covering material into the plastics extrusion chamber.

Production may be performed continuously, and depending upon the conformation of the cross-section of the strip 80 moulding, the moulding leaving the die may be reeled for despatch by known means, or cut up into pieces of equal length.

Flexible and profiled rigid materials may 85 be used as covering, e.g. textile fabrics,

linings or coatings fabricated from wood substances, or foils, more particularly metal foils or profiles fabricated from the latter or from thicker metal bands, may be used.

Even where the profile shape of the covering material is unfavourable with respect to the desired profile of the carrier moulding, the method according to the invention nevertheless ensures that no interstices are formed between the covering and the moulding element consisting of plastics.

It should be mentioned in this connection that the term strip moulding is to be understood as embracing such elements as are extremely thin but on the other hand correspondingly wide, so that table surfacings, wall facings or the like can possibly be manufactured by a combination of such strip mouldings into sheets formed by placing such strip moulding adjacent to each other edge-to-edge. The covering may serve various purposes when such strip mouldings are placed in position. It may serve merely for ornamentation, or directly as a surface protection. In the former case it is for example conceivable to use as covering an attractive fabric, possibly with suitable illustrations, which is applied by its side intended to be seen upon the plastics of the strip moulding, which in this case is transparent. The fabric or the picture will be visible through the plastic in the finished strip moulding, whereas in the latter case a bright metal foil may directly constitute the surface of the strip moulding or the surface of a table top.

Where, for example, the coverings are constituted by a flat metal band, if these coverings are not partly enclosed in the plastics, then they are retained on the moulding element solely by adhesion, whereas a covering consisting of a profiled metal is anchored positively in the plastics of the strip moulding. However, a secure fastening of the covering material on the moulding element, more particularly if this is constructed simply as a flat foil or flat band, can be achieved if a bonding agent is applied to the surface of the covering which serves for connection to the plastics before it is brought together with the plastics. It may furthermore be convenient, more particularly in the case of a profiled covering material, to cool the covering material at its surface part which is free from the plastics, more particularly when the material is brought together with the plastics. By this measure, the requisite solidification of the plastics compound of the moulding element which is located inside the profiled covering material can be achieved.

If for example the coverings are metallic, then it is necessary to ensure that, due to the pressure conditions prevailing in the interior of the die during the performance

of the method, the surface of the covering which is not in contact with the plastics is not damaged by the effect of friction. It is consequently convenient in all cases to apply a release agent to that portion of the surface of the covering which is not in contact with the plastics, at least when the covering is brought together with the plastics. This release agent may be e.g. a lubricant which is added as the covering material enters its path, but it is substantially more advantageous to apply to the covering, as the covering and the plastics are brought together, a preferably transparent layer of plastics which acts as a release agent. This plastics layer performs three functions in this connection: firstly it provides an effective surface protection for the covering, then a counterpressure is opposed to the pressure exerted on the covering by the feeding of the plastics to be connected to the covering, so that the feeding into the die of the plastics provided with the covering is rendered substantially more favourable, and lastly the said plastics layer may remain as a protective layer on the finished strip moulding and be removed therefrom only after the strip moulding has been placed in position.

Coverings which already exhibit an appropriately preshaped cross-section before they are brought together with the plastics may be subjected to a further deformation, after the covering has been laminated with the plastic, in or in front of or behind the die for their final profiling. It is thereby possible to manufacture even strip mouldings exhibiting a closed covering. In this case the covering will at first be preliminarily profiled in such a way that the plastics can reach the inside of the covering through an appropriate gap, whereupon the final profiling may be performed in or in front of or behind the die, and the plastics may thus be fully enclosed.

An apparatus with a die arrangement which possesses a guide element to receive the covering material and a guide channel which issues into the plastics extension chamber of the die, or extends as a slide-way as far as the die outlet and thus supports the covering material against the inflowing liquefied plastics, is highly suitable for performing the method. This apparatus is conveniently constructed as an extension head combined with an extruder device, in the housing of which the guide element is arranged, preferably exchangeably, together with the die. It is thus possible to insert appropriate guide elements and dies into the housing of the extension head, according to the particular strip profile required.

In order to create favourable conditions for the joining of the covering material to

the moulding elements, it is advantageous if that part of the guide element which guides the covering material is cooled and/or heat insulated, and that part for guiding the liquefied plastics is preferably heated. Where flexible covering materials are used, such as metal foils, the extension head may be combined with an extruder device which transports the liquefied plastics in the haul-off direction. In this case it is conceivable to introduce the covering material from the side or from above into the extension head. If on the other hand the covering has been at least roughly profiled, then it is favourable to construct the extension head in the form of an extension cross head which is preferably combined with a profiling device. In this case the covering material should be fed into the extension head in the haul-off direction, whereas the liquefied plastics passes through an extruder device into the die extension chamber from the side, since the profiling device creates unfavourable space conditions for the extruder device.

The profiling device may be so constructed that the covering material is both rough profiled and finally profiled before it enters the extension head. But if it is required to manufacture strip mouldings which are totally enclosed by a covering, then it is convenient to provide a rough profiling station and a final profiling station and the latter should then be arranged in front of the die extrusion chamber. According to a further development of the invention, a feed channel may be provided in the extrusion head before the side of the die adjacent to the extrusion chamber in order to feed to the guide path of the guide element, to protect the surface of the covering material, at least a gaseous pressure medium, but preferably a release agent, more particularly in the form of a relatively soft plastics.

A number of plastics strip mouldings fabricated by the method according to the invention and provided with a covering, and various apparatuses for performing the method according to the invention in the form of exemplary embodiments, are illustrated in the drawings, wherein:—

Figure 1 shows a perspective view of a decorative strip moulding having a flexible covering, and having a moulding strip consisting of plastics;

Figure 2 shows a perspective view of a decorative strip moulding having a covering constituted by a soft metal band and having a moulding element consisting of plastics;

Figure 3 shows a perspective view of a decorative strip moulding such as is customarily used in the case of glass sliding doors, which is provided with a profiled

covering constituted by a metal band;

Figure 4 shows a perspective view of a strip moulding provided with a profiled metal covering exhibiting a surface protection,

Figure 5 shows a partial longitudinal section through an extension head attached to an extruder device for manufacturing strip mouldings with an unprofiled covering — for example, of fabric — schematically illustrated;

Figure 6 shows a schematically drawn longitudinal section through a further extrusion head constructed as an extrusion cross head for the manufacture of strip mouldings with a profiled covering;

Figure 7 shows a partial section along lines 7-7 of Figure 6;

Figure 8 shows a view through a further exemplary embodiment of an extrusion cross head according to the invention.

The strip moulding shown in Figure 1 and manufactured by the method according to the invention exhibits a moulding element designated 12, on the underside of which a pediment 14 of barbed-shaped cross-section is shaped and serves to secure the strip moulding. The top side of the moulding element 12 exhibits a groove-shaped recess designated 16, the groove base of which is covered by a covering 18. This covering is constituted by a fabric strip which is introduced into the groove 16 during the actual manufacture of the strip moulding by means of the method according to the invention. An extrusion head, generally designated 20, for example, is used to manufacture this strip moulding (see Figure 5). An interchangeable guide element designated 24 is inserted in the housing 22 of the extrusion head. The guide element contains a channel 26 in which the fabric band 18, which is for example unreeled from an unreeling device 28 disposed above the extrusion head, is guided in the haul-off direction. The guide channel 26 issues into the die plate 30 arranged removably at the end face of the guide element. The guide element contains, immediately behind the die plate 30, an extrusion chamber 32 to which a plastics liquefied by an extruder device 36 can be fed under pressure via a channel 34 disposed in the housing 22 of the extrusion head. The value of the pressure is chosen so that the liquefied plastics can unite with the fabric in such a manner that the fabric band 18 is inseparable from the plastics element when the strip moulding 38 emerges from the die.

In the case of the strip moulding shown in Figure 2, instead of a fabric strip, a flat metal band 42 has been disposed on the moulding element consisting of plastics and

designated 40. It is clear that, in this case, a bonding agent designated 44 has been applied between the moulding element 40 and the metal band 42 acting as covering, 5 having been applied to the appropriate side of the metal band before the latter is introduced into a suitable extrusion head. This strip moulding may be manufactured, for example, by the extrusion head 10 previously described, in which case if the metal band is a relatively thin and flexible one it may be fed into the extrusion head in the same manner as the fabric band 18, but on the other hand if it is a metal band 15 which cannot be drawn off from an un-reeling device, then it is recommended, as indicated by chain-dotted lines in Figure 5, to introduce the metal band into the extrusion head in the haul-off direction.

20 Figure 3 shows a decorative strip moulding 50, such as is customarily used in glass sliding doors, and it is clear that a surface part of the same has been covered with a covering exhibiting a profile and constituted 25 by a metal band 52. The extrusion cross head 54 shown in Figures 6 and 7 may be used, for example to manufacture a strip moulding provided with a profile covering. Its guide element 56 has mounted on it, at 30 the opposite end to the die plate 58, a rough profiling station 60 with which a final profiling station 62 is associated on the housing of the extension cross head. Liquefied plastics passes under pressure 35 via a channel 64, by way of an extruder device 66, into the die extrusion chamber 68, past which the covering 52 having been finally profiled by the rough profiling and finer profiling stations 60, 62 is guided. As 40 it is clearly shown, a lubricant from a source of supply (not shown) is fed to the guide channel 70 of the guide element via a feed channel 72 and a connecting piece 74, and passes on to that surface of the covering 45 which is not in contact with the plastics where it forms a release film which prevents superficial damage as the covering is passed through the guide element, more particularly in the region of the die extrusion chamber 50 68, since the said surface of the covering is exposed to powerful frictional forces at that point by the pressure of the liquefied plastics.

Figure 4 shows a strip moulding for which 55 the moulding element 80 exhibits a covering 82 constituted by a profiled metal band which is similar in cross-sectional shape to the covering 52 of the strip moulding 50 according to Figure 3. However, in this 60 construction of the strip moulding, the covering exhibits on its upper surface a protective layer 84 of plastics which is applied directly during the manufacture of the strip moulding and may remain on the 65 covering as a source of protection until the

erection of the strip moulding and may thereafter be stripped off. Such a strip moulding may be achieved, for example, with the extrusion cross-head 86 shown in Figure 8. This extrusion cross-head, which corresponds substantially in its construction to the construction of the extrusion cross head according to Figures 6 and 7, but with the difference that the feed system for the release agent is omitted, exhibits opposite 70 to the feed channel 88, through which the liquefied plastics is fed to the die extrusion chamber, 90, a channel disposed in the guide element 92 and in the housing 94, through which plastics is fed under pressure, 80 possibly through a further extruder device not shown, on to the covering as it passes through the guide channel of the guide element. The die of the die plate 98 in this case is preshaped so that the desired 85 protective layer 84 covering the surface of the covering, and possibly consisting of transparent plastics, is produced. The guide element may possibly also be constructed so that it extends to incorporate the die 90 integrally in it by so profiling the guide channel to act as a shaping element for the plastics material.

WHAT WE CLAIM IS:—

1. A method for the manufacture of multi-part laminated mouldings which have a carrier moulding of plastics material entirely or partially provided with a ribbon-like cover, comprising the steps of extruding the plastics material through a die corresponding in cross-section to that of the carrier moulding, and mounting the cover-strip on the desired surface of the carrier moulding at a speed corresponding to the speed at which the carrier moulding emerges, 100 the cover-strip being brought into contact in non-molten state with the plastics material in an extrusion chamber which lies upstream of the actual extrusion die, a release agent being applied to that surface of the cover-strip not in contact with the plastics material and the two parts emerging from the die jointly as a complete laminated moulding.
2. A method as claimed in claim 1, wherein the surface of the cover material 115 which is to make contact with the plastics material is coated with an adhesive before it meets the plastics material.
3. A method as claimed in either of the preceding claims, wherein the cover-material is subjected to a further deformation in, before entering or after leaving the die but after it has been laminated with the plastics material.
4. A method as claimed in any of the preceding claims, wherein the cover-material is cooled on that surface not in contact with the plastics material, particularly after the cover-material has been brought into contact with the plastics 130

material.

5. A method as claimed in any of the preceding claims, wherein pressure means exert a constant pressure on the cover before it enters into the die.

6. A method as claimed in any preceding claim wherein the release agent is applied before the covering material is united with the plastics material.

10 7. A method as claimed in any of the claims 1 to 5 wherein a transparent plastics layer, which acts as release agents, is applied to the covering material when the covering material and the plastics material have been united.

8. Apparatus for performing the method claimed in claim 1 comprising a die unit and means for feeding thereto softened plastics material and a covering material, the die unit comprising a die, a plastics extrusion chamber and means for guiding the covering material into the plastics extrusion chamber.

9. Apparatus as claimed in claim 8 25 wherein the guiding means comprises a guide channel of which that portion confronting the outside surface of the covering material extends to the die outlet.

10. Apparatus as claimed in claim 8 30 wherein the feeding means comprises an extrusion head combined with an extruder device and the die unit comprises a housing which also includes a die element defining the said guiding means.

35 11. Apparatus as claimed in claim 10 wherein the die element is exchangeably mounted in the housing.

12. Apparatus as claimed in any of claims 8 to 11 wherein that part of the die

element which guides the covering material 40 is cooled and/or heat insulated and the part guiding the liquefied plastics material is heated.

13. Apparatus as claimed in any of claims 8 to 12 wherein the die unit com- 45 prises an extrusion cross head which is combined with a profiling device forming part of the guiding means for the covering material.

14. Apparatus as claimed in claim 13 50 55 wherein the profiling device includes a rough profiling station and a final profiling station.

15. Apparatus as claimed in claim 14 wherein the final profiling station is 55 arranged so that the plastics material passes through it after it passes through an extrusion head for the plastics material.

16. Apparatus as claimed in any of claims 8 to 15 comprising means for feeding 60 a release agent to the covering means within the die unit.

17. A method of manufacturing strip mouldings substantially as described herein with reference to Figures 1, 2 and 5 or 65 Figures 3, 6 and 7 or Figures 4 and 8 of the accompanying drawings.

18. Apparatus for manufacturing strip mouldings substantially as described herein with reference to Figures 1, 2 and 5 or 70 Figures 3, 6 and 7 or Figures 4 and 8 of the accompanying drawings.

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London, W.C.2.,
Agents for the Applicants.

Fig. 1

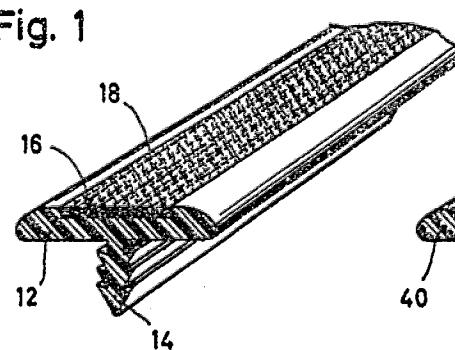


Fig. 2

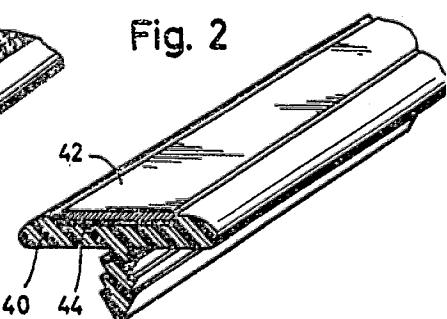


Fig. 3

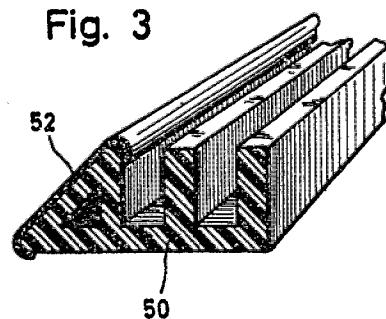


Fig. 4

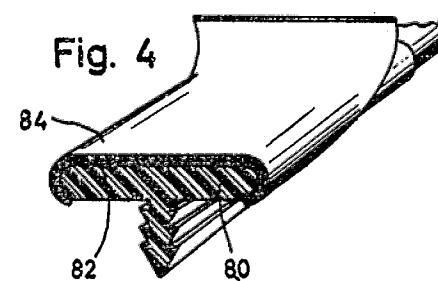
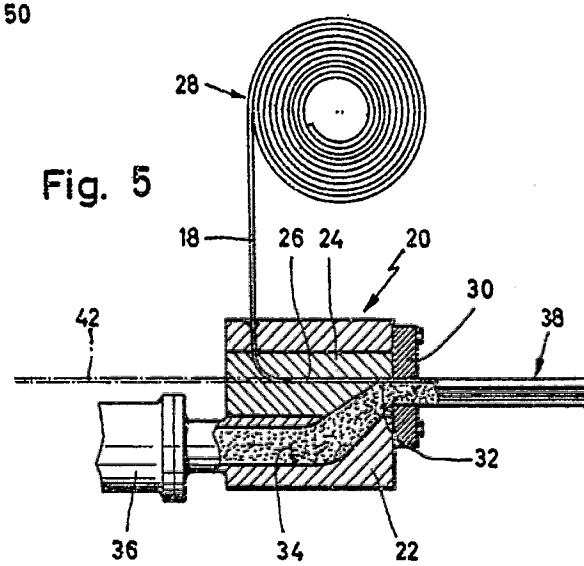


Fig. 5



1,076,033 COMPLETE SPECIFICATION

2 SHEETS

*This drawing is a reproduction of
the Original on a reduced scale.
SHEETS 1 & 2*

Fig. 6

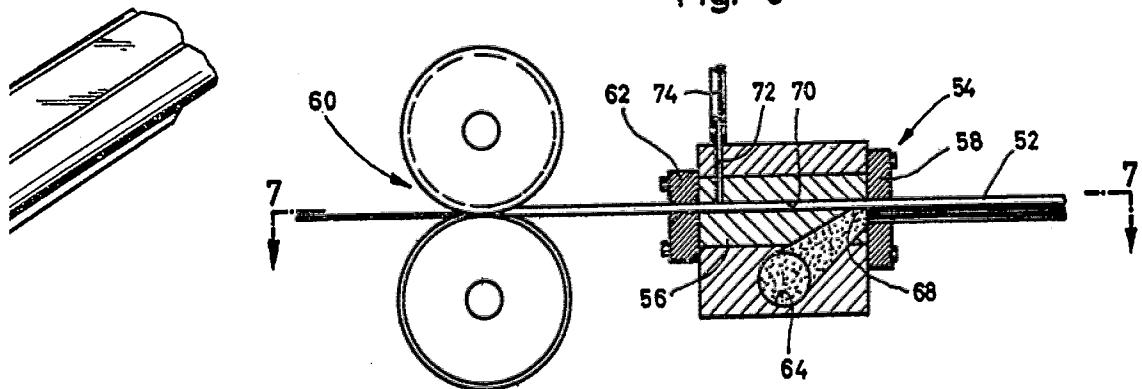


Fig. 7

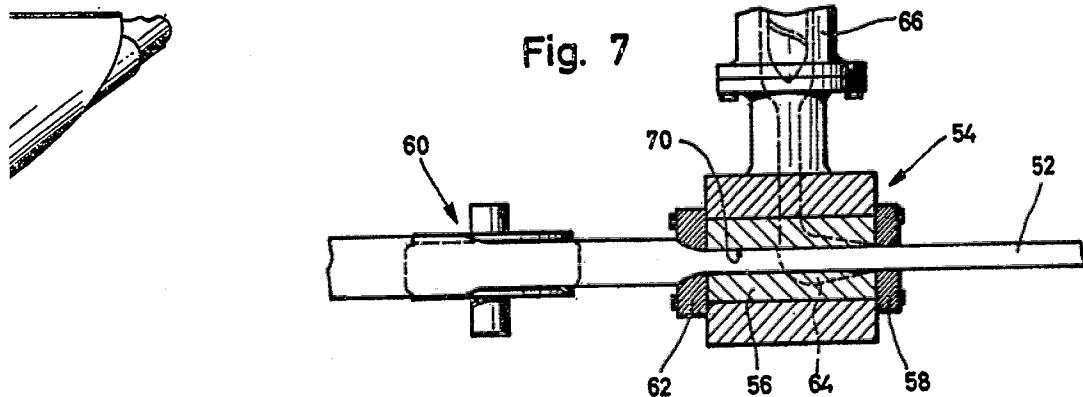
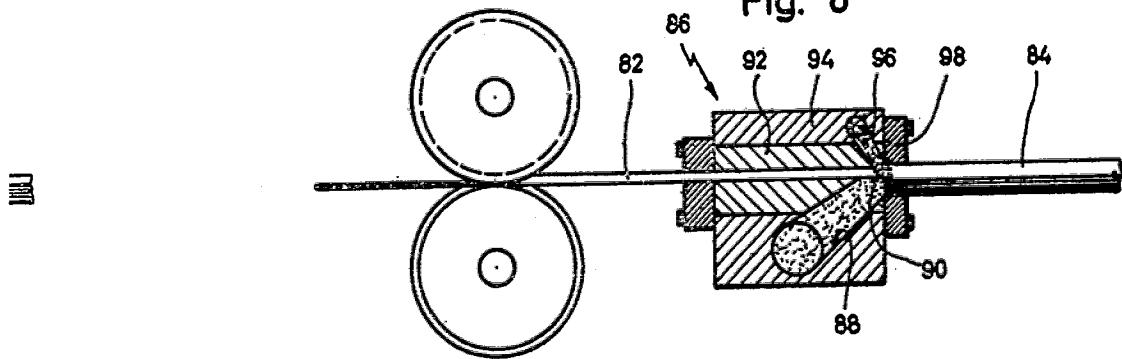


Fig. 8



1,076,033 COMPLETE SPECIFICATION
2 SHEETS
*This drawing is a reproduction of
the Original on a reduced scale.
SHEETS 1 & 2*

Fig. 1

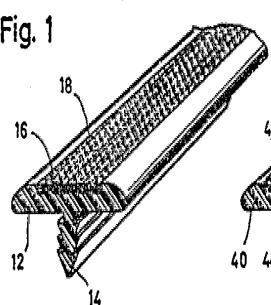


Fig. 2

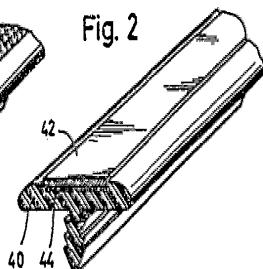


Fig. 6

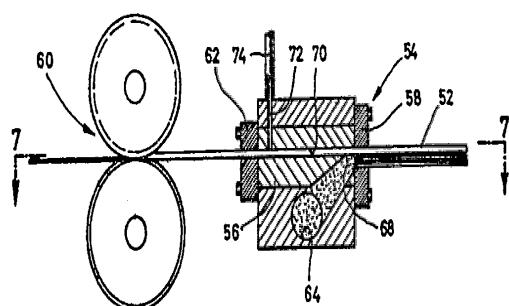


Fig. 3

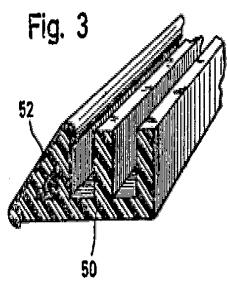


Fig. 4

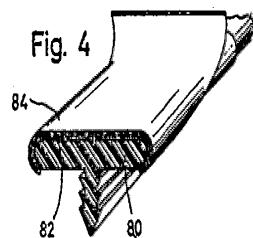


Fig. 7

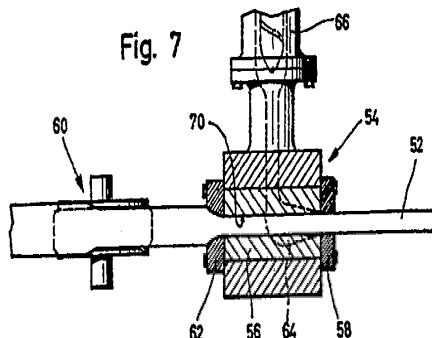


Fig. 5

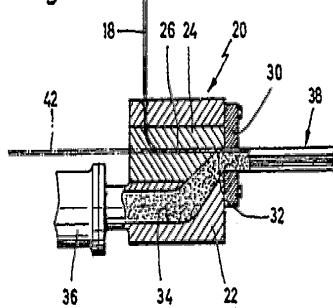


Fig. 8

